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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/863,652	05/22/2001	Eng-Chew Cheah	9818-050-999	1049
48591	7590	04/27/2005	EXAMINER	
MORGAN, LEWIS & BOCKIUS LLP 1111 PENNSYLVANIA AVENUE WASHINGTON, DC 20004			ZARNEKE, DAVID A	
			ART UNIT	PAPER NUMBER
			2891	

DATE MAILED: 04/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/863,652

Applicant(s)

CHEAH, ENG-CHEW

Examiner

David A. Zarneke

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Restart of Time Period

On April 19, 2005, applicant's attorney Frank Morris called the examiner noting that the action mailed 1/21/05 appeared to be the same as the previous office action mailed 8/23/04. Upon reviewing the file, it became apparent that the wrong action was mailed.

Therefore, the examiner is now mailing the proper action along with restarting the time period for response.

Response to Arguments

Applicant's arguments filed 11/23/04 have been fully considered but they are not persuasive. Two arguments are presented that attempt to define the present claims around the prior art.

The first argument is that since Lacap doesn't teach intermediate lead finger mounting substrate, Lacap obviously couldn't teach a heat sink coupled to the second surface of the intermediate lead finger mounting substrate.

The examiner takes the position that Lacap was relied upon to teach the attachment of a heat sink to a substrate on the side opposite the die is well known in the art and would have been obvious to include in the combined structure of Aoki and Gainey. Die packages produce a lot of heat that must be dealt with in order to ensure continued efficient performance of the die package. Generally, heat sinks are used to

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remove the heat from the package. Further, the heat sink is generally attached to the substrate on the side opposite the die. This is what Lacap is relied upon to teach. The fact that heat sinks are conventionally known in the art structures added to die packages and are generally known in the art to be added to the side of the substrate opposite the die.

The second argument is that there is no suggestion in these references that allows them to be combined.

The examiner takes the position that the reason to combine references is not required to be found in the references. See MPEP 2144, from which the following excerpt is taken:

The rationale to modify or combine the prior art does not have to be expressly stated in the prior art; the rationale may be expressly or impliedly contained in the prior art or it may be reasoned from knowledge generally available to one of ordinary skill in the art, established scientific principles, or legal precedent established by prior case law. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). See also In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000) (setting forth test for implicit teachings); In re Eli Lilly & Co., 902 F.2d 943, 14 USPQ2d 1741 (Fed. Cir. 1990) (discussion of reliance on legal precedent); In re Nilssen, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988) (references do not have to explicitly suggest combining teachings); Ex parte Clapp, 227 USPQ 972 (Bd. Pat. App. & Inter. 1985) (examiner must present convincing line of reasoning supporting rejection); and Ex parte Levengood, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993) (reliance on logic and sound scientific reasoning).

The reason to combine Lacap with Aoki and Gainey is that heat has a very negative effect on semiconductor packages, and heat sinks are very effective in removing heat from the package. Therefore, one of ordinary skill in the art at the time of the invention would have been motivated to use the heat sink of Lacap to remove the heat generated by the package of Aoki and Gainey.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki et al., US Patent 4,903,114, in view of Gainey et al., US Patent 6,313,519, and Lacap, US Patent 5,905,299.

Aoki (figure 7) teaches a semiconductor package, comprising:

an intermediate lead finger mounting substrate (11) having a first surface and a second surface;

a semiconductor die (51) with a bond pad (511), the semiconductor die being attached on the first surface of the intermediate lead finger mounting substrate;

a package lead (5);

a bond wire (18 & 19) comprising a first end portion coupled to the package lead, a second end portion coupled to the bond pad, and an intermediate portion (figure 7);

an intermediate lead finger (raised portion of 11) mounted on the first surface of the intermediate lead finger mounting substrate, wherein the intermediate lead finger is positioned between the package lead and the bond pad, and wherein the intermediate lead finger is attached to the intermediate portion of the bond wire, and remains so attached through a subsequent molding process (2, 25+).

Aoki fails to teach the use of one bond wire.

Gainey teaches a structure having an intermediate lead finger and one continuous bond wire (figure 4).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the one bond wire of Gainey in the invention of Aoki because it would be easier and less expensive to contact one wire as opposed to dealing with two separate wires.

Both Aoki and Gainey fail to teach a heat sink coupled to the second surface of the intermediate lead finger mounting substrate; and a mold compound that encloses the semiconductor die, a portion of the package lead, the bond wire, the intermediate lead finger, and the heat sink.

Lacap teaches a typical leadframe with heat sink (614) coupled to the second surface of the intermediate lead finger mounting substrate (610); and a mold compound (604) that encloses the semiconductor die (606), a portion of the package lead (602), the bond wire (612), the intermediate lead finger (when combined with Gainey, it inherently would be encapsulated), and the heat sink (614).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the heat sink and encapsulation of Lacap in the combined invention of Aoki and Gainey because heat sinks and encapsulants used in this manner would be more than obvious to a skilled artisan. The use of conventional materials to perform there known functions in a conventional process is obvious (MPEP 2144.07).

Regarding claim 10, Aoki teaches the intermediate lead finger and the intermediate lead finger mounting substrate are formed of a non-conducting material (3, 53+).

With respect to claim 11, Aoki teaches the intermediate lead finger comprises a non- conducting portion for attaching to the intermediate portion of the bond wire (3, 53+).

As to claim 12, while Aoki, Gainey and Lacap fail to teach the use of a programmable logic device as the semiconductor die, it would have been obvious to

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one of ordinary skill in the art at the time of the invention to use a programmable logic device as the semiconductor die because programmable logic devices are conventionally known in the art semiconductor die useable in package presently claimed. The use of conventional materials to perform there known functions in a conventional process is obvious (*In re Aller* 220 F.2d 454,456,105 USPQ 233,235 (CCPA 1955)).

In re claim 13, Aoki teaches the semiconductor die is mounted on a center portion of the first surface of the intermediate lead finger mounting substrate, and wherein the intermediate lead finger is mounted on a peripheral portion of the first surface of the intermediate lead finger mounting substrate (figure 7).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

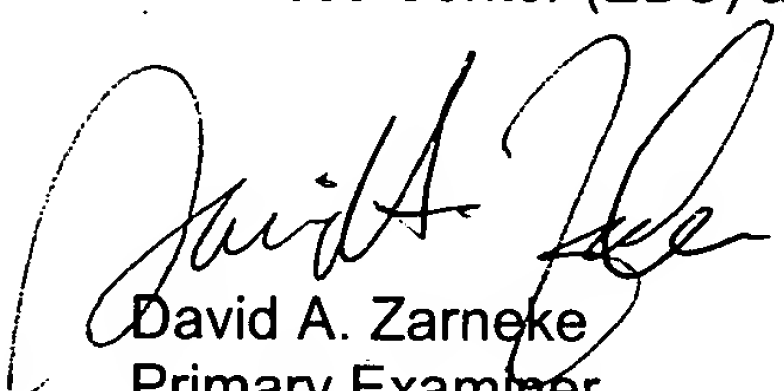
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Zarneke whose telephone number is (571)-272-1937. The examiner can normally be reached on M-F 7:30 AM-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on (571)-272-2034. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


David A. Zarneke
Primary Examiner
January 14, 2005

now 4/19/05